

SHIP SYSTEM Shipboard Piping Systems	SUBSYSTEM	MRC CODE R-	
SYSTEM	EQUIPMENT System Piping	RATES GS-11/12	M/H 24.0
MAINTENANCE REQUIREMENT DESCRIPTION 1. Conduct SEMAT assessment procedure for ultrasonic testing of piping systems.		TOTAL M/H 24.0 ELAPSED TIME	
SAFETY PRECAUTIONS 1. Forces afloat comply with NAVOSH Program Manual for Forces Afloat, OPNAVINST 5100.19 series.			
TOOLS, PARTS, MATERIALS, TEST EQUIPMENT TEST EQUIPMENT 1. Ultrasonic test meter MATERIALS 1. [1749] Lubricating compound, silicone Hazardous Material User's Guide (HMUG) Group 11, Disposal Method 1 TOOLS 1. [0196] Brush, wire, scratch, Carbon steel, 14-1/2" 2. [0611] Hammer, hand, Scaling, 1 LB NOTE: Numbers in brackets can be referenced to Standard PMS Materials Identification Guide (SPMIG) for stock number identification.			
PROCEDURE NOTE 1: Total man-hours listed are for accomplishment per system based on a DD class ship. Number of personnel and total man-hours may require adjustment on other class ships. NOTE 2: Accomplish either before availability, after availability, or before deployment.			
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HAZARDOUS MATERIALS CONTROL STATEMENT (U)

The Hazardous Material Users Guide (HMUG), OPNAV P-45-110-91, provides additional control measures, precautions, personal protective equipment (PPE), and spill controls for the hazardous material(s) identified in the Tools, Parts, Materials, Test Equipment block.

PROCEDURE (Contd)

NOTE 3: Ultrasonic testing shall be accomplished on sections of the piping system located on 2nd Deck and below in the following locations:

- a. All elbows, tees and bends. (Special attention shall be given to the outside radius).
- b. Piping low points.
- c. Areas requested to be surveyed by Port Engineer or ship's CHENG.

NOTE 4: The minimum allowable wall thickness for any piping system shall not be less than .050 inch as per NSTM section 505.

NOTE 5: Do not take UT readings on sil-brazed fittings. Sil-brazed fitting materials are porous and will not provide true readings.

NOTE 6: When conducting UT assessment of steam system piping or other high temperature systems, use teflon style probe covers with silicon lubricant. UT assessment of high temperature systems is best accomplished when system has been inactive for 8 hrs.

CAUTION: Those personnel who are in contact with wastewater, or assess wastewater treatment plants, should keep basic immunizations current. Immunizations required include typhoid, polio, and tetanus.

CAUTION: Personnel shall exercise extreme care when performing UT assessments on active steam piping and other high temperature systems.

1. **Conduct SEMAT Assessment Procedure for Ultrasonic Testing of Piping Systems.**

- a. Prepare the pipe or tube to be assessed by removing all rust, scale, and paint to produce a moderately bright metal surface. (On insulated/lagged piping, use a utility knife to cut a triangular flap in the insulation/lagging in the area to be tested. Upon completion of testing in that area, reinsert the flap back into place.)
- b. Calibrate the ultrasonic test meter. The meter shall be calibrated to read within .005 inch of the test block thickness.

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PROCEDURE (Contd)

- c. Take one reading at the bottom of piping/tubing. Where applicable, a second reading at a 90° interval around the circumference of the pipe shall be taken on the outside radius where flow is turbulent. When flow through a tee is supplied from the center run and discharges through either branch, readings shall be taken at the bottom and the back end of the tee (the wall of the tee that the flow discharges against).
- d. Record all readings taken on UT plans or EOSS diagrams at the location where the readings were taken.
- e. Compare recorded readings against the minimum allowable wall thickness values indicated in UT Piping Data Tables. When readings are at or below the minimum allowable wall thickness values indicated in the tables, or if marginal readings that may drop below the minimum prior to the next scheduled overhaul are indicated, continue surveying along the run of piping until satisfactory readings are indicated on both sides of the deteriorated sections. Measure and record the length and location of the deteriorated sections, as well as the size and material of the pipe. Report all discrepancies identified on applicable SEMAT discrepancy reporting forms (2-K or Material Assessment Form).
- f. At the completion of the system survey, the lowest recorded reading at each test point shall be recorded onto two (2) clean plans/diagrams. One shall be turned in with the system test report and the other shall be retained for analysis.

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UT PIPING DATA TABLES**NOTE:**

1. The Design thickness listed is for reference purposes only. This figure will vary between classes and between ships within a class. The min wall thickness listed has been calculated based on NSTM section 505 requirements.
2. Some classes may use carbon steel for Fuel Oil systems. The min wall thicknesses listed for CRES apply.
3. The minimum allowable wall thickness for copper tubing 4" and below is .050".

FUEL OIL FILL AND TRANSFER SYSTEM				
NOM PIPE SIZE	OUT DIA	MATERIAL	DES THKNESS	MIN THKNESS
10"	10.75	CRES	.365	.057
8"	8.625	CRES	.322	.050
6"	6.625	CRES	.280	.050
6"	6.625	CU/NI 70/30	.134	.055
5"	5.563	CRES	.258	.050
5"	5.563	CU/NI 70/30	.125	.050
4"	4.500	CRES	.237	.050
4"	4.500	CU/NI 90/10	.109	.050
3"	3.500	CRES	.216	.050
2.5"	2.875	CRES	.203	.050
2.5"	2.875	CU/NI 70/30	.083	.050
2"	2.375	CRES	.154	.050
2"	2.375	CU/NI 90/10	.083	.050
1.5"	1.900	CU/NI 90/10	.072	.050
1.25"	1.660	CRES	.140	.050
1"	1.315	CRES	.133	.050

PROCEDURE (Contd)

BOTTOM BLOW PIPING				
NOM PIPE SIZE	OUT DIA	MATERIAL	DES THKNESS	MIN THKNESS
2"	2.375	CS	.343	.130
1"	1.315	NI/CU	.179	.115
.75"	1.050	NI/CU	.154	.115

AUX SW, CHT, MN DRAINAGE, JP-5 AND FIREMAIN SYS				
NOM PIPE SIZE	OUT DIA	MATERIAL	DES THKNESS	MIN THKNESS
8"	8.625	CU/NI 90/10	.148	.077
6"	6.625	CU/NI 90/10	.134	.059
5"	5.563	CU/NI 90/10	.125	.050
4"	4.500	CU/NI 90/10	.109	.050
3"	3.500	CU/NI 90/10	.095	.050
2.5"	2.875	CU/NI 90/10	.083	.050
2"	2.375	CU/NI 90/10	.083	.050
1.5"	1.900	CU/NI 90/10	.072	.050
1"	1.315	CU/NI 90/10	.065	.050

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PROCEDURE (Contd)

**DISPOSAL METHODS FOR HAZARDOUS MATERIAL/WASTE IDENTIFIED IN THE
TOOLS, PARTS, MATERIAL, AND TEST EQUIPMENT BLOCK**

Method 1: Containerize waste in original container, if possible, or use standard container as listed in Appendix B3-D of OPNAVINST 5100.19B, "Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat" and Naval Ships' Technical Manual (NTSM) S9086-T8-STM-010/CH-593, Pollution Control. Store in accordance with OPNAVINST 5100.19B and NSTM Chapter 670. Do not mix chlorinated solvents with nonchlorinated solvents. Mark, label, or tag the container, according to ship procedures, with specific contents and any information on the contaminants. This information must also be provided on DD Form 1348-1 at time of offloading.

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